

CLAIMS

- 1 1. A web-handling system comprising:
 - 2 a) a cylinder including a circumferential surface comprising at least one pair of
 - 3 edges, each pair of edges defining a cavity in the cylinder;
 - 4 b) a first winding device disposed in a cavity for feeding a web material onto the
 - 5 circumferential surface of the cylinder along a feed path;
 - 6 c) a second winding device also disposed in a cavity for receiving the web
 - 7 material off the circumferential surface of the cylinder along an exit path; and
 - 8 d) a displacement device for displacing at least one of the paths of the web
 - 9 material.
- 10
- 1 2. The system of claim 1 wherein the displacement device displaces at least one of
- 2 the winding devices.
- 3
- 1 3. The system of claim 1 wherein the displacement device comprises a dancer roll in
- 2 contact with the at least one of the paths.
- 3
- 1 4. The system of claim 1 wherein the displacement device comprises an angular
- 2 displacement arm in contact with the at least one of the paths.
- 3
- 1 5. The system of claim 1 wherein the displacement device travels along a linear
- 2 trajectory.
- 3
- 1 6. The system of claim 1 wherein the displacement device travels along a curved
- 2 trajectory.
- 3
- 1 7. The system of claim 1 wherein the web material feeds onto or comes off the
- 2 surface of the cylinder at a contact point on the cylinder surface, the displacement device
- 3 displacing at least one of the paths in relation to a plane tangent to the contact point.
- 4

- 1 8. The system of claim 7 wherein the displacement device is capable of maintaining
2 the at least one of the paths substantially in the tangent plane.
3
- 1 9. The system of claim 1 wherein each of the at least one pair of edges is round and
2 differs from the rest of the circumferential surface in radius.
3
- 1 10. The system of claim 1 further comprising a sensing device that senses a tension in
2 the web, said sensing device generating a signal to actuate the displacement device.
3
- 1 11. The system of claim 10 wherein the sensing device actuates the displacement
2 device when sensing a loss of tension.
3
- 1 12. The system of claim 10 wherein the sensing device comprises a sensor associated
2 with the circumferential surface of the cylinder for detecting a force applied by the web
3 against the surface.
4
- 1 13. The system of claim 12 wherein the sensor is selected from the group consisting
2 of a force-sensitive resistor, a load cell and a piezo-electric sheet based sensor.
3
- 1 14. The system of claim 10 further comprising a processor for receiving an input from
2 the sensing device, processing the input and sending an output to the displacement
3 device.
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- 1 15. The system of claim 14 wherein the system maintains a set value for the tension
2 in the web.
3
- 1 16. The system of claim 15 wherein said set value comprises a range.
2
- 1 17. The system of claim 1 wherein both the first and second winding devices are
2 disposed in the same cavity.
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- 1 18. The system of claim 1 further comprising multiple first winding devices and
2 multiple second winding devices.
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- 1 19. The system of claim 18 wherein the system comprises multiple cavities and
2 wherein the winding devices are disposed in the multiple cavities.
3
- 1 20. A web-winding device for wrapping a web material around a cylinder along a
2 travel path leading from an interior of the cylinder over a surface thereof and back into
3 the interior of the cylinder, the device including a tension adjuster for adjusting a tension
4 in the web material by displacing a portion of the web material in relation to a plane
5 tangent to a contact point on the cylinder, the contact point being where the portion of the
6 web material leads onto or comes off the cylinder surface.
7
- 1 21. The device of claim 20 wherein the winding advice comprises a spool.
2
- 1 22. The device of claim 20 wherein the interior of the cylinder comprises multiple
2 cavities.
3
- 1 23. The device of claim 20 wherein the device travels along a linear trajectory.
2
- 1 24. The device of claim 20 wherein the device travels along a curved trajectory.
2
- 1 25. The device of claim 20 wherein the device displaces the portion of the web
2 material in response to a change of the tension in the web material.
3
- 1 26. A method for adjusting tension in a web material feeding onto and coming off a
2 circumferential surface of a cylinder, the method comprising displacing a portion of the
3 web material in relation to a plane tangent to a contact point on the circumferential
4 surface of the cylinder, the contact point being where the portion of the web material
5 feeds onto or comes off the surface of the cylinder.
6

- 1 27. The method of claim 26 further comprising maintaining the portion of the web
2 material substantially in the tangent plane.
3
- 1 28. The method of claim 26 wherein the web material is displaced by an angular
2 displacement arm.
3
- 1 29. The method of claim 26 wherein the web material is displaced by a dancer roll.
2
- 1 30. The method of claim 26 wherein the circumferential surface of the cylinder
2 comprises at least one pair of edges, each pair of edges defining a cavity in the cylinder,
3 the web material being wound on at least one spool disposed in one of the cavities.
4
- 1 31. The method of claim 30 wherein the web material is displaced by the at least one
2 spool.
3
- 1 32. The method of claim 30 wherein the at least one pair of edges are round and differ
2 from the rest of the circumferential surface in radius.
3
- 1 33. The method of claim 32 comprising displacing the portion of the web material
2 such that the contact point is not on the at least one pair of edges.
3
- 1 34. The method of claim 26 wherein the web material is displaced along a linear
2 trajectory.